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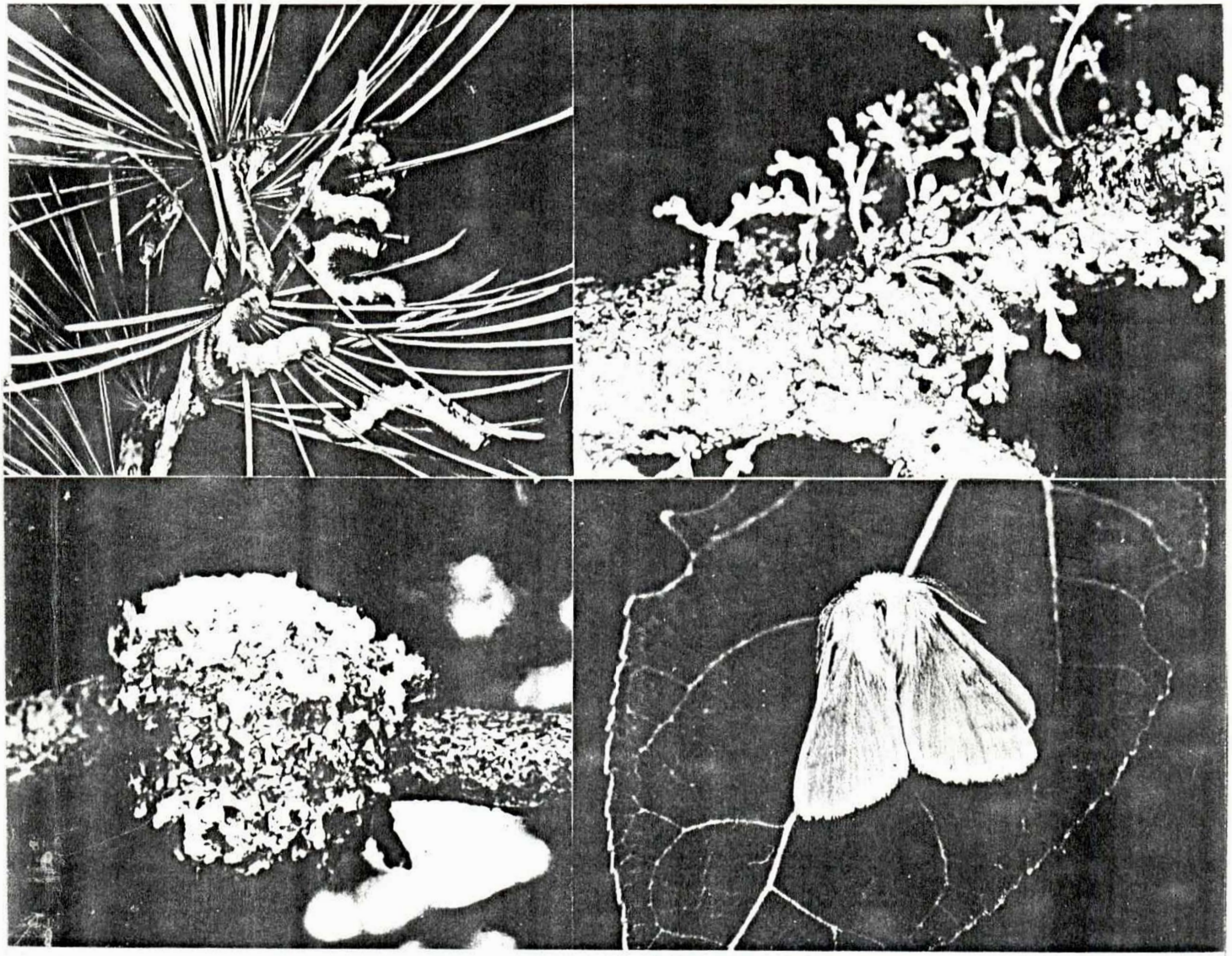
FOREST INSECT AND DISEASE CONDITIONS

In The NORTHERN REGION

1964



U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE
DIVISION OF STATE AND PRIVATE FORESTRY

MISSOULA, MONTANA

1380 (3000)

January 1965

FOREST INSECT AND DISEASE CONDITIONS IN THE NORTHERN REGION 1964

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COVER PHOTO: Clockwise, from upper left-hand picture: Larvae of larch sawfly feeding on needles; plants of lodgepole pine dwarf-mistletoe protruding from limb; male forest tent caterpillar moth resting on alder leaf; fruiting bodies of western gall rust on lodgepole pine limb.

U.S. DEPARTMENT OF AGRICULTURE - FOREST SERVICE
Division of State and Private Forestry
Region 1
Missoula, Montana

FOREST INSECT CONDITIONS

SUMMARY OF CONDITIONS

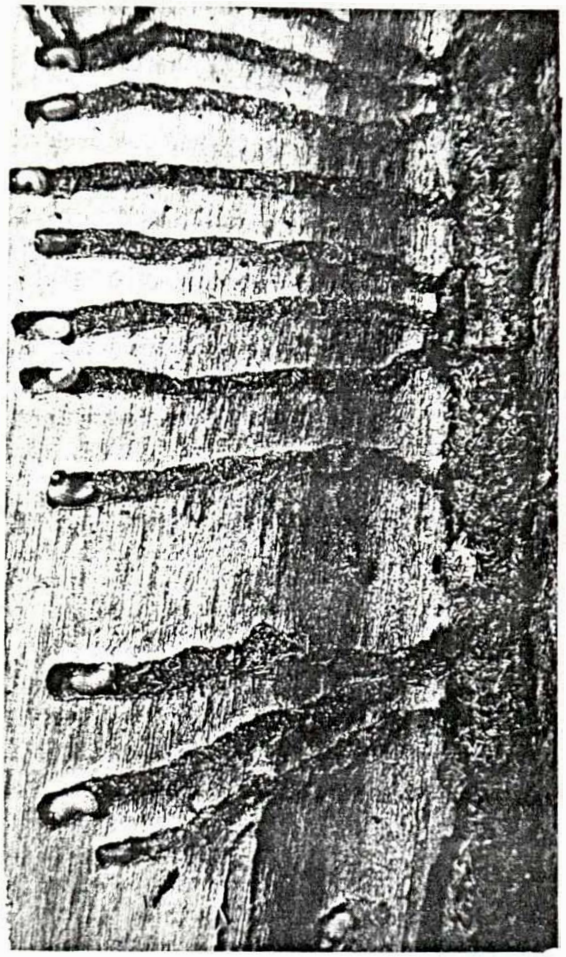
Damage by the mountain pine beetle has increased. Chronic infestations persist in mature western white pine stands on the Kaniksu, Coeur d'Alene, St. Joe, and Clearwater National Forests, Idaho. Losses range from 3 to 14 percent in some stands. Low level epidemics are present in many ponderosa pine stands on the Lolo and Lewis and Clark National Forests, Montana. Epidemics of Douglas-fir beetles have declined since 1963 on the Nezperce National Forest, Idaho and on the Kootenai, Flathead, Lolo, and Gallatin National Forests, Montana. However, approximately 12,000 acres are still heavily infested in the Swan Lake area on the Flathead Forest. Fir engraver beetle epidemics have diminished in northern Idaho's grand fir stands. The greatest number of attacked trees is within 81,500 acres northeast and southeast of Bigfork, Montana. The Oregon pine engraver killed very few trees during 1964. Epidemic populations of the western balsam bark beetle are active in Yellowstone National Park, Wyoming, and along the southern border of Montana. The larch casebearer has spread throughout 8½ million acres of larch type in the Northern Region. A major epidemic of Douglas-fir tussock moth has developed in 190,000 acres of grand and Douglas-fir type on the St. Joe National Forest, Idaho and damage is expected to increase during 1965. About 4,800 acres of Douglas-fir near Kalispell and 250 acres south of Polson, Montana, were heavily defoliated by the tussock moth. Isolated infestations near private homes and on farm woodlots were found in six other areas. The spruce budworm epidemic maintains a high level. Defoliation was visible from the air on 2,189,590 acres. Visible damage increased from 6,500 acres in 1963 to 166,607 acres in 1964 on the Nezperce National Forest, Idaho. Pine needle-sheath miner damage can be detected in most lodgepole and ponderosa pine stands in the Northern Region. Its feeding was most noticeable on 53,000 acres in the north half of the Flathead National Forest. Larch sawfly defoliation has decreased but is still visible on thousands of acres on the St. Joe and Clearwater National Forests, Idaho. Three larch stands, 1,500 to 4,000 acres in size, were damaged by what seems to be the larch budmoth. A false hemlock looper defoliated several hundred acres of Douglas-fir on the National Bison Range, Montana. Douglas-fir needle midges have infested almost all of the Douglas-fir stands in the Northern Region. Christmas tree cutting has been abandoned in many areas because of this pest. Epidemics of the forest tent caterpillar have persisted for 2 years in northern Idaho. It severely defoliated about 130,000 acres of birch, alder, willow, aspen, and cottonwood during 1964.

BARK BEETLES

MOUNTAIN PINE BEETLE (Dendroctonus ponderosae (formerly D. monticolae) Hopk.).--In general, damage to western white and ponderosa pine trees has been increasing in the Northern Region since 1962. About 11,000 acres along the Yaak River drainage on the Kootenai National Forest, Montana, contained numerous lodgepole pines that had been attacked in 1963, but this infestation declined sharply in 1964. Also, on the Kootenai National Forest, mountain pine beetle activity seems to have increased in much of the ponderosa pine type. Some mature western white pine stands on the Kaniksu National Forest, Idaho, continue to be depleted; however, the general trend appears to be downward. The Upper St. Joe River area on the St. Joe National Forest, Idaho, contains chronic infestations of mountain pine beetle in mature western white pine stands. The percentage of trees killed has been increasing each year. Losses averaged about 5 percent in 1964. A slight increase is predicted for 1965, also. Numerous subdrainages of the Little North Fork of Clearwater River, St. Joe Forest, Idaho, contain an increasing amount of beetle-killed white pines. About 7,500 acres are involved. Western white pine stands on the Clearwater National Forest, Idaho, are still sustaining heavy losses. Areas along the North Fork Clearwater River have the greatest number of killed trees. Three to 14 percent of the trees in some stands were killed during 1964. It was estimated that about 75 million board feet of mature western white pine trees are killed annually by blister rust and mountain pine beetles within the Canyon Block of the Clearwater Forest. A moderate increase in the number of trees attacked by beetles is predicted for this area in 1965. Chronic infestations in mature white pine stands located in subdrainages of the North Fork Coeur d'Alene River, Idaho, have persisted for over 30 years. There were no indications that these infestations decreased during 1964. About 70 areas, containing from 5 to 25 killed trees, were detected from the air in these drainages. There was an increase in mountain pine beetle activity within ponderosa pine stands on the northwest part of the Lolo National Forest, Montana. Many groups of ponderosa pines were killed in stands within the Snowy Mountains, Little Belts, and Castle Mountain areas on the Lewis and Clark National Forest, Montana.

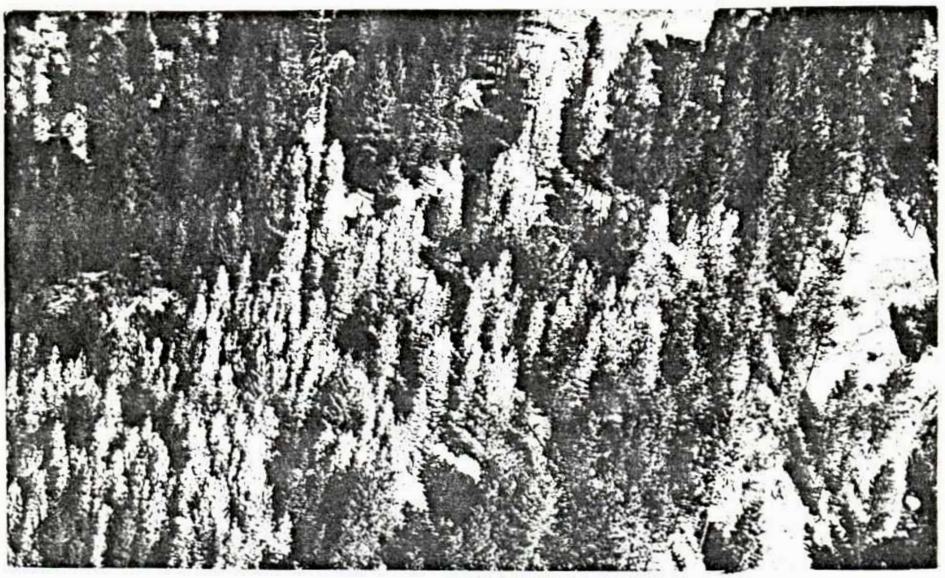
DOUGLAS-FIR BEETLE (Dendroctonus pseudotsugae Hopk.).--Damage by this beetle, which seemed to reach a peak in 1963, has declined in the Northern Region. About 13 groups of dying trees (10 to 100 trees per group) remained south of Grangeville, Idaho, to Slate Creek. Areas on the Kootenai National Forest, Montana, that were heavily infested during 1963 only contained a few groups of attacked trees this year. They were located northeast of Fortine and Eureka, and north of Libby and Troy. There was a noticeable reduction of dying trees within the Swan River drainage and South Fork Flathead River drainage, Montana. However, approximately 12,000 acres are still infested in

the Swan Lake area. Only an occasional small group of attacked trees were detected throughout the Douglas-fir type on the Lolo National Forest, Montana. The most abundant groups were in the Fish Creek, Thompson River, and Clearwater River drainages. Several light infestations persisted along the Gallatin River drainage, Montana. Douglas-fir beetle damage has been decreasing on the Gallatin National Forest for the past 2 years.



Main egg gallery of Douglas-fir beetle on underside of bark. Note half-grown larvae at the end of their mines.

Right: Gallery pattern of fir engraver beetle in subalpine fir bark.



Ponderosa pine trees killed by the pine engraver beetle.

FIR ENGRAVER (Scolytus ventralis Lec.).--Damage to grand and subalpine fir trees located northeast of Bigfork, Montana, and along the east side of the Swan River to Goat Creek, Montana, has been increasing since 1961. During 1964, about 81,500 acres were heavily infested in the above area. Some remnants of a 1961 fir engraver epidemic remain in the vicinity of Weippe, Idaho. Fir stands on the St. Joe and Nezperce National Forests, Idaho, contain occasional attacked trees.

PINE ENGRAVER (Ips pini (formerly I. oregonis) Eichh.).--The number of pine trees killed annually by this beetle has decreased steadily since the epidemic year of 1961. Ponderosa pine slash, cut in the spring of 1964, was heavily infested in several areas near Missoula, Montana. Emerging brood attacked only a few living trees surrounding this slash. Logging slash did cause three small ips infestations on the Salmon River Ranger District and one on the Slate Creek District, Nezperce National Forest, Idaho. North of Frenchtown, Montana, a few groups of about 30 ponderosa pine trees were killed.

THE WESTERN BALSAM BARK BEETLE (Dryocoetes confusus Sw.).--Destructive numbers of these beetles have persisted for several years within Yellowstone National Park, Wyoming. During 1964, 61 areas containing scattered groups of from 10 to 150 subalpine fir trees were seen from the air. Some groups of dying subalpine fir could be found at higher elevations in forests along the southern border of Montana.

DEFOLIATORS

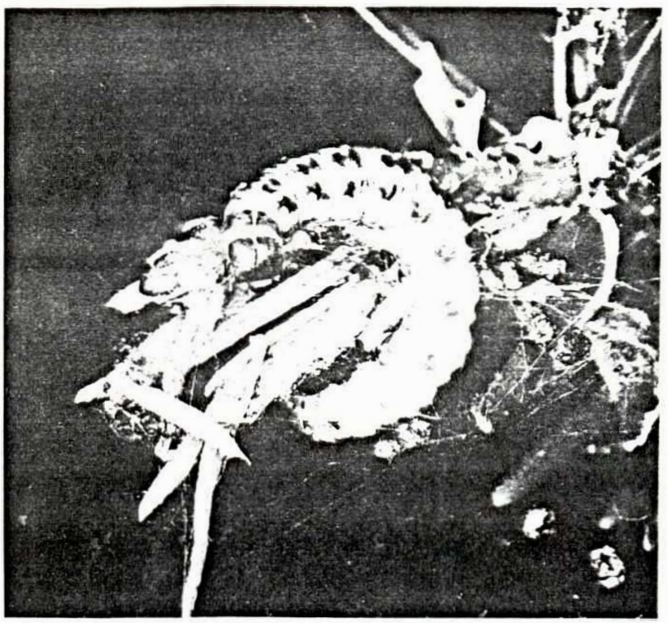
LARCH CASEBEARER (Coleophora laricella Hbn.).--This pest has spread rapidly since its discovery near St. Maries, Idaho in 1959. The limits of infested larch in the Northern Region extend from the Washington border east to Paradise, Montana, and from the Canadian border south to the Middle Fork Clearwater River, Idaho. Although very heavy defoliation has occurred annually, in some Idaho areas, no tree mortality has been observed. During 1964 parasitic wasps (Agathis pumila) were liberated in six infested larch stands. The number of wasps released totaled 8,600. It is anticipated, that once established, wasps can be collected from these sites and be transported to other infested areas. A pilot test with technical malathion applied by helicopter at about 8 fluid ounces (equivalent to 9.73 ounces actual malathion by weight) per acre was made in May 1964. Excellent results were obtained. This method shows promise if aerial sprays are needed for control.

Left: Building cages to rear a parasitic wasp which kills the larch casebearer moth.

DOUGLAS-FIR TUSSOCK MOTH (Hemerocampa pseudotsugata McD.).--A major epidemic developed during 1964 in northern Idaho. About 190,000 acres are infested between Troy and Plummer. Grand fir and Douglas-fir trees were 70 to 90 percent defoliated within several thousand acres. Damage is expected to increase in 1965. Some control measures are anticipated. In 1963, 1,400 acres of Douglas-fir were defoliated near Kalispell, Montana. The infested area increased to about 4,800 acres this year. A polyhedrosis virus, which caused some tussock moth mortality in 1963, greatly reduced the population during 1964. Therefore, damage is expected to be much less in 1965. Near Polson, Montana, about 250 acres of Douglas-fir were moderately defoliated. The same amount of damage will probably occur in 1965. Isolated tussock moth infestations near private homes and on farm woodlots in Bigfork, Montana, and Coeur d'Alene, Hayden Lake, Rathdrum, Bonners Ferry, and Copeland, Idaho, are predicted to decrease in 1965.

Right: Grand fir trees heavily defoliated by the Douglas-fir tussock moth.

SPRUCE BUDWORM (Choristoneura fumiferana Clem.).--Epidemics have persisted in the Northern Region for over 14 years. For the past 6 years, information collected from permanent plots in chronically defoliated areas indicates infestation status in general has changed little.



A sixth instar spruce budworm larvae feeding on Douglas-fir needles.

The following tabulation summarizes data showing infestation trends in this Region during 1963 and 1964:

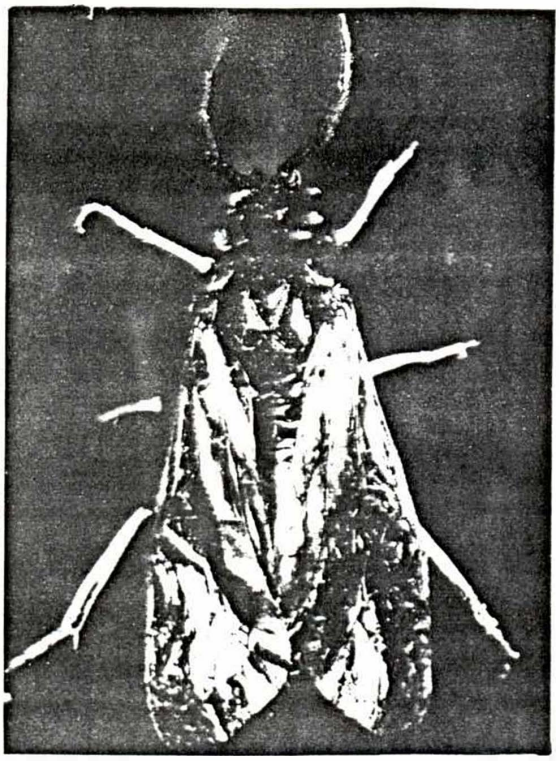
	1963	1964
Percent defoliation	35.00	35.00
Egg masses per M sq. in.	9.50	11.90
Percent egg mass parasitism	.00	1.10
New foliage growth (inches)	.93	.76
New foliage destroyed (inches)	.32	.26
Net length of new foliage (inches)	.61	.50

During 1964 defoliation on 2,189,590 acres was visible from the air. This was an increase of 177,886 acres over the number detected in 1963. Most of this increase was on the Nezperce National Forest, Idaho. The infestation there increased from 6,500 acres in 1963 to 166,607 acres in 1964. Additional stands of timber are also being infested toward the southeast on the Custer National Forest, Montana.

Based on the number of egg masses per thousand square inches of foliage, it seems that, Region-wide, percent defoliation in 1965 will equal that of 1964.

PINE NEEDLE-SHEATH MINER (Zelleria haimbachi Busck.).--Damage by this pest can be detected in most lodgepole and ponderosa pine stands in the Northern Region. In 1963, it defoliated about 168,000 acres of lodgepole pine trees on the Flathead National Forest, Montana. Defoliation during 1964 on this Forest was visible from the air on 53,000 acres. One extensive infestation was east of West Glacier and another was west of Whitefish. A remnant of last year's epidemic is still apparent near Elbow Lake in the Swan River drainage. About 2,000 acres of lodgepole were reported to be lightly defoliated along the southwest border of Yellowstone National Park, Wyoming. Ponderosa pine stands along the west side of the Bitterroot River drainage have been infested for several years. During 1964, about 4,000 acres west of Stevensville, Montana, suffered rather heavy defoliation.

LARCH SAWFLY (Pristiphora erichsonii Hartig).--The number of infested areas and amount of larch timber defoliated seemed to reach a peak during 1963 in the Northern Region. Damage began to decline in 1964. The St. Joe National Forest, Idaho, contains 24,000 acres of infested larch. Four isolated infestations ranging in size from 150 to 700 acres were detected east of Weippe and northeast of Pierce, Idaho, on the Clearwater National Forest.



Left: An adult larch sawfly.

A LARCH BUDMOTH (probably Zeiraphera griseana Hubner).--The number of larch stands defoliated by what is probably Z. griseana has increased since 1963 in the northwestern forests of Region 1. Positive identification of this moth has not been determined, but damage symptoms and adult moths resemble those of the above species. Defoliation was observed west of Porthill, Idaho, in eight infested areas totaling 2,000 acres. West of Troy, Montana, over 4,000 acres were infested. Defoliation was visible from the air on 1,500 acres at the head of Ninemile Creek, east of Superior. Ground surveys show that damage also extends to the northwest for 7 miles.

2,000
4,000
1,500
7,500

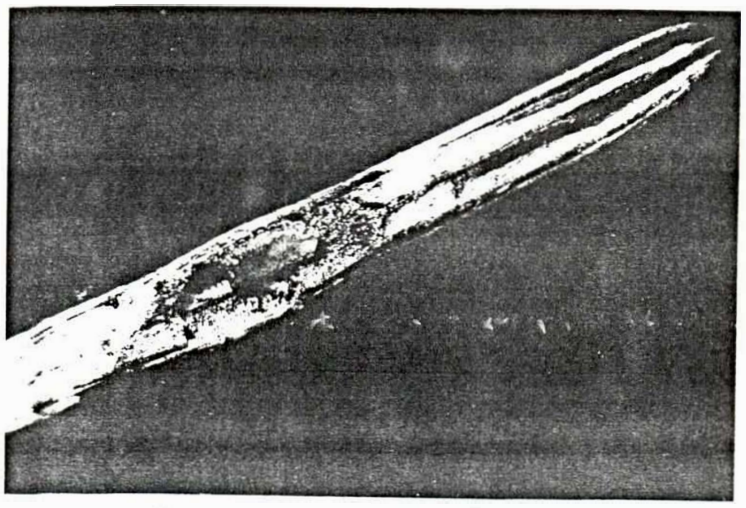
A LARCH LOOPER (probably Semiothisa sexmaculata Pack.).--Many sections of larch in Beaver and Little Beaver Creek drainages, Lolo National Forest, Montana, were heavily defoliated during 1963. Damage symptoms resembled those made by larch budmoths. But pupae collected from the duff in June 1964 produced moths that looked like S. sexmaculata. Damage to these stands was very light during 1964. These looper larvae were also found on larch foliage at the head of Ninemile Creek, Lolo National Forest.

A FALSE HEMLOCK LOOPER (Nepytia freemani Munroe).--Damage by this insect was recorded for the first time in the Northern Region when it defoliated three areas (totaling about 375 acres) of Douglas-fir

on the National Bison Range, Moiese, Montana, in 1963. Defoliation could not be seen from the air on one of these areas during 1964, but it was heavier and had spread on the other two. Since its discovery, adult moths and egg masses have been observed in many northwestern Douglas-fir stands.

DOUGLAS-FIR NEEDLE MIDGES (Contarinia pseudotsugae and C. constricta Condr.).--Since 1957, these midges have infested most of the Douglas-fir stands within the Northern Region. Damage to current needles decreased somewhat on the Nezperce and Clearwater National Forests, Idaho, but increased along the Kootenai and Fisher River drainages, Montana. Midge damage is apparent, but light, in other stands over the Region.

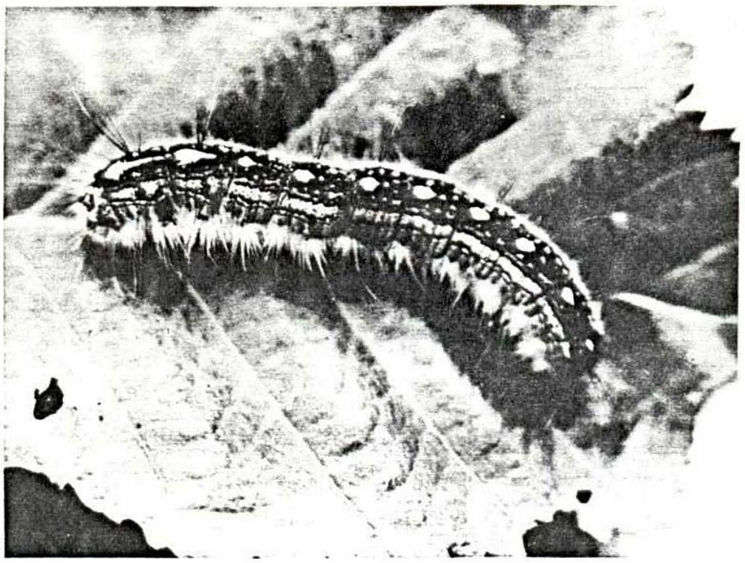
Feeding is particularly harmful to Christmas trees because needles mined by the larvae during the summer begin to fall by October.



Right: Douglas-fir needle midge larva inside "gall" on needle.

FOREST TENT CATERPILLAR (Malacosoma disstria Hbn.).--An epidemic appeared during 1963 in northern Idaho along river bottoms. The caterpillars ate birch, alder, willow, aspen, and cottonwood foliage within 116,000 acres. In Idaho during 1964 over 13,000 acres were defoliated along the Priest River drainage and from Careywood north to Bonners Ferry about 100,000 acres were ravaged again. Near Kingston and along the North Fork Coeur d'Alene River drainage, more than 6,000 acres were heavily defoliated.

Epidemics of this moth usually last from 2 to 3 years in this Region. It is anticipated that damage will begin to decrease next year.



Left: Forest tent caterpillar on leaf.

Right: Colony of forest tent caterpillars on alder branch.

FOREST DISEASE CONDITIONS

SUMMARY OF CONDITIONS[1/]

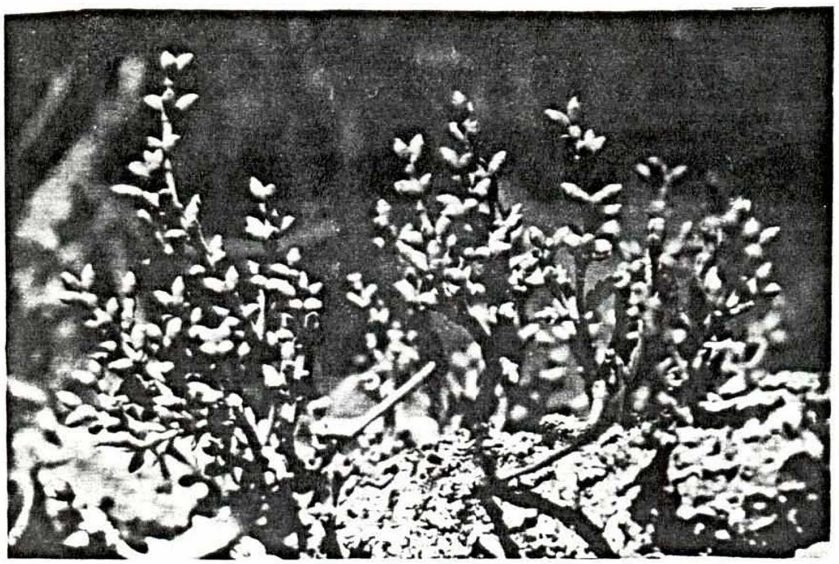
Dwarfmistletoes continue as the primary native forest disease in Region 1. Although widespread growth loss is occurring in many dwarfmistletoe-infected stands throughout the Region, their immediate effects are becoming apparent in some campground areas. These campgrounds sustain small annual losses and are slowly becoming denuded. Heavy sporulation of Peridermium stalactiforme, a rust of lodgepole pine, was noted on young mature trees, and a high percentage of cankers was found on young seedlings in the St. Regis River drainage. Bastard toad flax (Comandra umbellata), the alternate host of comandra blister rust of lodgepole pine, was moderately to heavily infected in the vicinity of Kerr Dam and near Augusta, Montana. Needle casts were widespread and severe in certain localities. Rhabdocline pseudotsugae, the Douglas-fir needle cast, was severe in the Bitterroot, Clark Fork, and Flathead River drainages for the first time in 4 years. Hypodermella concolor and H. montivaga, needle casts of lodgepole pine, caused severe browning and defoliation in scattered areas throughout the Custer, Gallatin, and Helena National Forests. The red band fungus, Dothistroma pini, was found on ponderosa and lodgepole pine in the Washington portion of the Kaniksu National Forest. This is believed to be the first collection of the fungus from that State.

DWARFMISTLETOES

DWARFMISTLETOE (Arceuthobium spp.).--This parasitic plant pest continues to be the number one native forest disease pest in the Region. Although the dwarfmistletoes cause considerable annual losses through loss of increment and tree mortality in woodlands, their immediate effect is most apparent in many campground areas. Some of the campgrounds, which sustain a small annual loss through mortality, are slowly being denuded by the effects of this pest.

LODGEPOLE PINE DWARFMISTLETOE (Arceuthobium americana Nutt.) is present in most of the lodgepole pine stands throughout the Region. Selective logging increased the vigor and spread of this dwarfmistletoe species and has resulted in a general infection of the lodgepole pine reproduction in many areas.

1/ The purpose of this report is to indicate the areas in which problems were found to be caused by specific disease organisms. Many of these organisms occur throughout the Region and the remarks made are not intended to delimit their distribution.

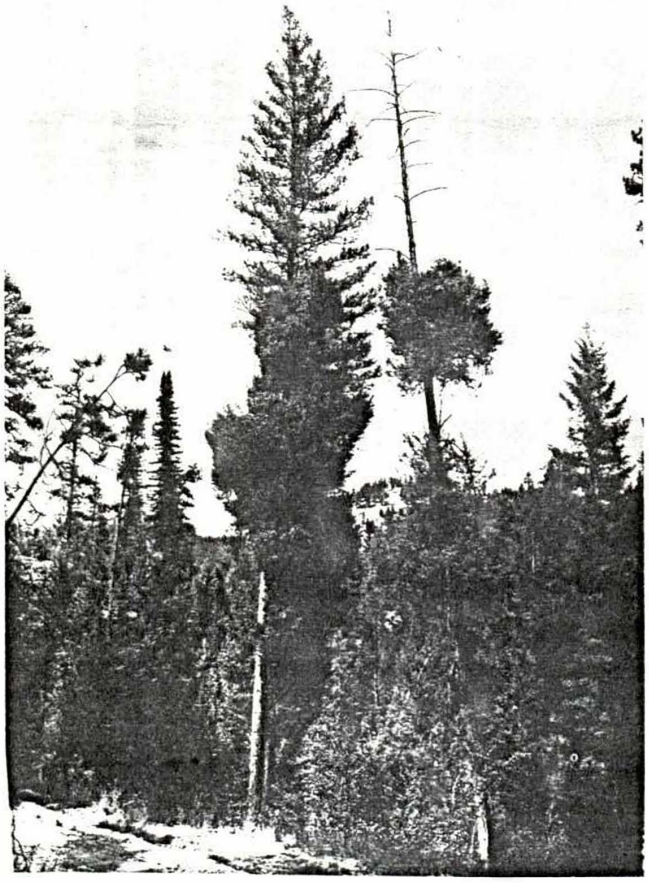


Immature dwarfmistletoe plant on lodgepole pine (Arceuthobium americana)

DOUGLAS-FIR DWARFMISTLETOE (Arceuthobium douglasii Engelm.) is not known to occur east of the Continental Divide. The heaviest concentrations of this parasite include the Clark Fork, Bitterroot, and Flathead River drainages of western Montana.

LARCH DWARFMISTLETOE (A. campylopodum forma laricis (Engelm.) Gill) is widely distributed throughout the range of larch in western Montana and northern Idaho. Considerable variation in the degree of infection by this organism occurs in most drainages. The explanation for this variation in distribution is not known.

A 3-year silvicultural control program to rehabilitate the Sleeping Child burn area of the Bitterroot National Forest has been initiated. By removal of single unburned trees and islands of green trees within the burn area, as well as removal of certain infected border areas, it is estimated that about 28,000 acres will eventually be free of dwarfmistletoe. In addition to this program, about 16,000 acres were subjected to silvicultural practices and timber stand improvement to control dwarfmistletoe infections.



Left: Damage to Douglas-fir caused by dwarf-mistletoe (Arceuthobium douglasii).

ROOT ROT

ARMILLARIA ROOT ROT (Armillaria mellea Vohl ex. Fr.).--About 600 acres of 20- to 30-year-old ponderosa pine on the Young Creek Flat, Kootenai National Forest, were found to be lightly infected with Armillaria root rot. Since much of this area has been recently thinned, it is possible that the stumps will afford an excellent food base for the fungus. This could result in a buildup of the root rot and increased infections of the remaining stand.

Armillaria root rot was also found on western white pine near the Cuban Hill plantation, Kaniksu National Forest; and Brett Creek plantation on the Coeur d'Alene National Forest in 1964 and 1963 respectively. Little evidence of new mortality could be found in Brett Creek area in 1964.

RUSTS

COMANDRA BLISTER RUST (Cronartium comandrae Pk.).--Recent infections of comandra blister rust could not be found in areas of lodgepole pine examined in 1964. In some areas, in which infections occurred about 15 to 20 years ago, cankers have now encircled the bole and additional damage through mortality and spike tops can be noted.

The alternate host, Comandra umbellata, bastard toad flax, was found to be heavily infected with rust at Kerr Dam on Flathead Lake and near Elkhorn Hot Springs. Light to moderate infections of the comandra plants were found near the Augusta Ranger Station.

STALACTIFORM RUST (Peridermium stalactiforme Arth. and Kern.).--Severe infection with stalactiform rust of young lodgepole pine seedlings was found near DeBorgia, Montana. Sporulation of cankers in lodgepole pine trees (80 years plus) was also heavy in this area as well as in the area immediately east of Lookout Pass.

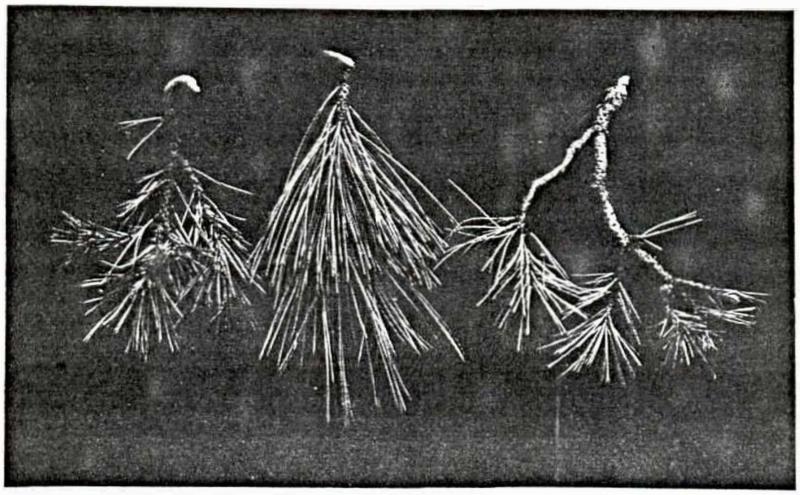
WESTERN GALL RUST (Peridermium harknessii Moore).--Additional extensive surveys have shown most lodgepole pines in the Region to be infected with western gall rust. In most young stands, the infections are relatively light and little damage should result if infections do not increase. Many of the pole-sized lodgepole stands east of the Divide have a high percentage of boles with hip cankers. It has been estimated that hip cankers, probably caused primarily by bole infections of western gall rust, have reduced returns from pole sales up to 25 percent in some areas.

NEEDLE DISEASES

LODGEPOLE NEEDLE CAST (Hypodermella concolor (Dearn.), Darker and H. montivaga (Petrak) Dearn.).--Heavy defoliation of lodgepole pine resulted from infection of two needle cast fungi in scattered areas throughout the Region. Infection by Hypodermella concolor was the primary cause of the defoliation near Lincoln. In the Gallatin Valley both H. concolor and H. montivaga were found in the area with approximately equal frequency. In some instances both fungi were present on the same tree causing severe browning and ultimate defoliation of the previous season's needles. H. montivaga was found to be the cause of severe discoloration in the Rock Creek drainage near Red Lodge, Montana. Past history of this pest has not shown any tree mortality losses. However, loss of growth undoubtedly is a resultant of repeated infections, but data on this aspect is not currently available.

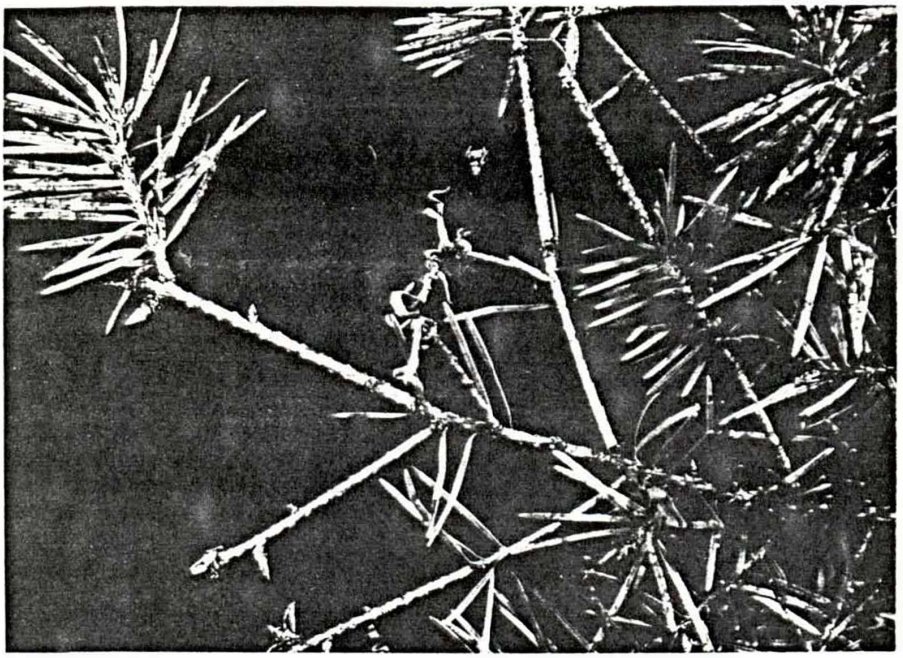
ELYTRODERMA NEEDLE CAST (Elytroderma deformans (Weir) Darker).--Heavy infection centers of Elytroderma needle cast continue to cause an unknown amount of damage to ponderosa pine in western Montana. In some areas such as the West Fork of the Bitterroot National Forest nearly all seedling, sapling, and poles are infected.

Although heavy sporulation occurred during May, relatively few new infection sites could be noted in the Bass Creek area. This may be a result of the relatively cool weather prior to and during the infection period, which retarded bud opening.



Symptoms of Elytroderm needle cast (Elytroderma deformans) on ponderosa pine. Specimen in center from uninfected tree; two specimens on either side with shortened, necrotic needles from heavily infected branch. Considerable browning evident on specimen on left side of photo.

RHABDOCLINE NEEDLE CAST (Rhabdocline pseudotsugae Syd.).--Severe infection centers of Rhabdocline needle cast were noted in wild stands of Douglas-fir along the west side of the Bitterroot Valley, in the Flathead Valley, and in scattered areas of the Clark Fork drainage. This is the first time since 1961 that severe browning has been noted. In some areas, necrotic lesions begin to appear on the needles in mid-September becoming increasingly prevalent throughout the succeeding months.



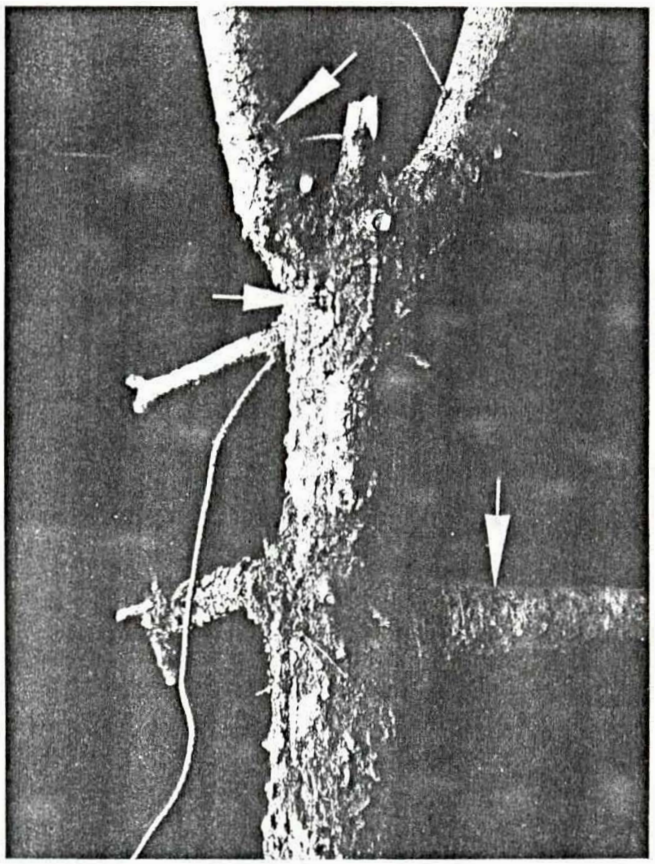
Damage to Douglas-fir terminals caused by Rhabdocline needle cast (Rhabdocline pseudotsugae). Note necrotic spots on year-old needles.

LARCH NEEDLE DISEASES (Hypodermella laricis Tub. and Meria laricis Vuill.).--Moderate to severe discoloration of western larch occurred in northwestern Montana and northern Idaho. Although Hypodermella laricis was found to be the incitant in a few cases, Meria laricis was the primary cause of the discoloration in the area of Trout Creek on the Kaniksu National Forest, and throughout the Kootenai and Flathead National Forests. Meria needle disease has become more prevalent in the past 2 years than previously noted. In areas where the larch needle disease complex is present in addition to the larch casebearer, aerial surveyors have had difficulty in determining the causal agent of the discoloration.

RED BAND NEEDLE DISEASE (Dothistroma pini Hulbary var. linearis Thyr.).--Moderate to heavy infections of the red band needle disease were found in many of the ponderosa pine plantations in northern Idaho. Mortality of the lower branches has apparently weakened the trees sufficiently in the Elk River area to cause subsequent infections by Armillaria root rot, as considerable mortality is evident. This fungus was found on both lodgepole and ponderosa pine in the Hungry Creek-Mush Creek area of the Kaniksu National Forest in Washington. This is believed to be the first report of the organism from that State.

MISCELLANEOUS DISEASES

ATROPELLIS CANKER (Atropellis piniphila (Weir) Loman and Cash).--Considerable damage to young and suppressed lodgepole pine in the vicinity of Kings Hill, Lewis and Clark National Forest, was caused by Atropellis cankers. In some trees examined, three to four cankers per stem were noted. Although mortality is not a prime factor, deformed main stems and branches and occasional spike tops reduce the merchantability of the stands.



Right: Atropellis canker of lodgepole pine. Black spots (arrows) are fruiting bodies of the fungus.

CALICIOPSIS CANKER (Caliciopsis pseudotsugae Fitzpatrick).--Small cankers and fruiting bodies on Douglas-fir resembled the description of Caliciopsis pseudotsugae (Funk, 1963, Canadian Jour. of Bot. 41:503). Although no damage was associated with these cankers, Funk suggests possible associative effects between these cankers and other more serious diseases of Douglas-fir.